

CHAPTER 3 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the existing environmental conditions for the area of potential affect (APE) for the proposed DARPA project and alternatives. Information in this chapter represents the environmental baseline conditions against which all alternatives will be compared in Chapter 4, to identify potential impacts that may result from alternatives, and provide a basis for comparison of impacts. An APE is a geographical area in which potential environmental effects to a resource value, including use, would be reasonably likely to occur, and may vary for different resource values.

NEPA and CEQ regulations, as well as BLM and DOD procedures for implementing NEPA, specify that an EA should focus on those resource values potentially subject to impact. In addition, these guidance documents indicate that the level of analysis to any given resource value should be commensurate with the level of potential conflict or affect anticipated for that resource value and consistent with other environmental laws. Critical elements of the human environment must be analyzed in an EA, unless they are either not present in the APE, or present but not affected. These facts should be documented.

- Energy. The Grand Challenge field test is a short-term event that does not support any activities that would have a direct or indirect adverse impact on energy development, production, supply or distribution. Both the design of the route through field surveys, and the safety control measures that will be employed should ensure that energy infrastructure would not be jeopardized.
- Environmental Justice. The Grand Challenge field test is a short term event that does not support any activities that would result in environmental impacts to low-income or minority populations that are disproportionately high or adverse as compared to the impacts on the general population.
- Farmlands Prime/Unique. Particular route segments traverse active farmlands within the APE. Impacts to farmlands would be limited to the temporary traverse by vehicles on existing roadways, and would not affect the continued use of these lands for agriculture.
- Floodplains. A number of route segments traverse floodplains in the Mojave and Colorado desert regions. The Grand Challenge field test is a short term event that does not involve any construction or modification to the land. Impacts to floodplains would be limited to the temporary traverse by vehicles on existing roadways, and would not result in any increase in runoff or other adverse affect to floodplains.
- Ground Water. The Grand Challenge field test is a short-term event that is not water consumptive, and ground water levels would not be affected.
- Wild & Scenic Rivers. The Grand Challenge field test is a short-term event that would not have a direct or indirect adverse impact either on designated wild & scenic rivers or on the suitability of eligible rivers for subsequent designation.

- Wilderness. Particular route segments may run adjacent to boundaries, but vehicles would not leave routes, and would remain outside of wilderness.

3.2 GENERAL SETTING

Exhibit 1 identifies the areas of the Mojave and Colorado Desert regions potentially affected by the Grand Challenge field test (Phase 4). The event would use a specific route derived from one or more networks, previously described in Chapter 2 for each action alternative. The event would be operated on paved and unpaved roadways and open areas. The networks start outside of Barstow, California, in Stoddard Valley, and trend generally eastward ending in the vicinity of Primm or Jean, Nevada. Most of the network traverses undeveloped BLM lands. Some segments pass through populated towns and cities (see Exhibit 3 for examples).

The Mojave and Colorado Desert regions are characterized by arid conditions with low precipitation. The dominant vegetation in these regions is creosote bush scrub; however, variations in elevation, local precipitation patterns, and landform contribute to the development of other vegetation types. Route segments in the northern half of the APE traverse a series of mountain ranges separated by broad alluvial valleys which include valley floors, playas and dry lake beds. Route segments in the southern half of the APE traverse less varied terrain which is fairly homogenous in elevation and vegetation. A number of route segments in the central portion of the APE cross the Mojave River, which is the predominant hydrologic feature in the Mojave Desert. The River spans from the base of the eastern San Bernardino Mountains near Hesperia, eastward through Afton Canyon, and terminates at Soda Lake within the Mojave National Preserve. Most of the water flow in the river is subterranean.

3.3 VEGETATION

The networks start outside of Barstow in Stoddard Valley within Mojave creosote bush scrub, the dominant plant community in this portion of the Mojave Desert. The various networks change in elevation as they move eastward towards and into Nevada. At the lowest elevations, particularly in association with the numerous playas and dry lake beds, desert saltbush scrub replaces the Mojave creosote bush scrub and is the second most prevalent plant community that would occur along any of the proposed routes. Together these two plant communities, Mojave creosote bush scrub and desert saltbush scrub, comprise over 70 percent of the natural occurring vegetation. Criss-crossing the networks, particularly on the valley floor, are numerous desert dry washes. Within these linear habitats that are usually crossed at perpendicular angles by the various networks are the Mojave wash scrub and Mojave riparian forest plant communities. Together these two desert dry wash plant communities account for less than 10 percent of the natural vegetation. Within the eastern portion of the networks and at higher elevations, the Mojave creosote bush scrub plant community is replaced by Mojave mixed woody scrub and Mojavean juniper woodland and scrub. These two plant communities comprise the remaining

20+ percent of the natural occurring vegetation within the various networks. These plant communities are listed below and are described in order of abundance, following the widely accepted descriptions provided in Holland's *Preliminary Descriptions of the Terrestrial Natural Communities of California* (1986 and 1992 update).

3.3.1 Mojave Creosote Bush Scrub

As stated above, this creosote-dominated desert scrub community is the dominant plant community found within the various networks and occupies the majority of the networks, being replaced by other plant communities, as defined below, as the result of elevation changes or changes in other physical parameters along the networks (e.g., the presence of a desert dry wash). It is characterized by widely spaced shrubs separated by bare ground. During spring months the bare ground is filled with a variety of annual grasses and wildflowers. This community is found in areas with eroded soils with very little moisture such as slopes, fans, and valleys. The most common plant species occurring within this community are creosote bush (*Larrea tridentate*), bursage (*Ambrosia dumosa*), desert cassia (*Cassia armata*), yucca (*Yucca schidigera*), and cheesebush (*Hymenoclea salsola*).

3.3.2 Desert Saltbush Scrub

The saltbush scrub plant community is found in association with the creosote bush scrub plant community, generally occurs at lowest elevations along the edge of playas and dry lake beds, and is the second most predominant plant community within the networks. This community is dominated by species of saltbush (*Atriplex*). Upslope areas have desert holly (*A. hymenolytra*), shadscale (*A. confertifolia*), bursage, and winter fat (*Krascheninnikovia*). Closer to the edge of the desert playas, this community is dominated by allscale (*A. polycarpa*), fourwing saltbush (*A. canescens*), mesquite (*Prosopis pubescens*), and alkali sink habitat. The alkali sink habitat is often the first plant community encountered off the edge of the desert playa and includes bush seepweed (*Suaeda moquinii*), greasewood (*Sarcobatus vermiculatus*), iodine bush (*Allenrolfea occidentalis*), mixed saltbush (*Atriplex* sp.), and salt grass (*Disticlis spicata*).

3.3.3 Mojave Wash Scrub

This low-growing open shrub community can be found in sandy bottoms of wide canyons, arroyos, and braided washes that criss-cross, usually at perpendicular angles, through the various networks. The Mojave wash scrub represents the third most common plant community. Species within these washes have evolved to withstand flooding as well as long, dry periods. Common species include cat's claw acacia (*Acacia gregii*), allscale, and black-banded rabbitbrush (*Chrysothamnus paniculatus*).

3.3.4 Mojave Mixed Woody Scrub

The Mojave Mixed Woody Scrub community consists of a mixture of shrubs characteristic of mid-elevations of the Mojave Desert. It is found primarily in the eastern portions of the networks along the California/Nevada border. Joshua tree (*Yucca brevifolia*) is a conspicuous overstory in this community. Common shrubs are smooth horsebrush (*Tetradymia glabrata*), spiny menodora (*Menodora spinescens*), cheesebush (*Hymenoclea salsola*), box thorn (*Lycium andersonii*), green ephedra (*Ephedra nevadensis*), and four-wing saltbush. Blackbrush (*Coleogyne ramosissima*) becomes the dominant shrub at higher elevations, often forming pure stands on drier south or southwest-facing slopes. Blackbrush intergrades with sagebrush (*Artemisia* sp.) at higher elevations.

3.3.5 Mojave Riparian Forest

The Mojave Riparian Forest is riparian habitat that occurs throughout the networks in association with the various drainages crossing the area, including the Mojave River. It is characterized by fairly open streamside forest dominated by cottonwood (*Populus fremontii*), willows (*Salix gooddingii* and *S. laevingata*), and arrowweed (*Pluchea siercea*), with an understory of Torrey saltbush (*Atriplex torreyi*) and slender willow (*Salix exigua*). Other species typically found in this habitat are Tamarisk (*Tamarix* sp.), rabbit brush (*Chrysothamnus* sp.), and greasewood.

3.3.6 Mojavean Juniper Woodland and Scrub

This open woodland occurs in the eastern portion of the networks and at higher elevations. It is dominated by juniper (*Juniperus californicus*) with an open shrubby understory. Typical shrubs found in the understory are great basin sage (*Artemesia tridentata*), blackbush (*Coleogyne ramosissima*), and Joshua trees (*Yucca brevifolia*).

3.3.7 Non-Native Invasive Species

OHV activity is known to spread non-native invasive species by transporting seeds. The spread of invasive species may displace native species, including species that are threatened, endangered and otherwise sensitive within the Mojave and Colorado Desert regions. Whole vegetative communities may be transformed affecting vegetation communities and the wildlife dependent on these habitats.

3.4 THREATENED & ENDANGERED, AND SENSITIVE PLANT SPECIES

Two federal or state listed or BLM-sensitive plant species are known to occur within the vicinity of the proposed network and are further described below.

3.4.1 Mojave Monkey Flower

This BLM-sensitive plant species is a restricted endemic whose entire range is within the western Mojave Desert. It is found in Joshua tree woodland and creosote bush scrub communities. It favors granitic soils and is most often found on gravelly banks of slopes above washes that are not subject to regular water flows. It is an annual species that blooms from April to June. Several populations are in or adjacent to the Stoddard Valley OHV open area and in the vicinity of Daggett, California.

3.4.2 White-margined Beardtongue

White-margined beardtongue occurs in southern Nevada, western Arizona, and in the western Mojave Desert in San Bernardino County, California. This BLM Sensitive plant species is isolated from its primary ranges and is found in the sand fields and washes north of Pisgah Crater in the southern Mojave Desert. There are also 15 populations in southern Nevada, predominantly clustered near Las Vegas, with twelve from Clark County and three from Nye County.

White-margined beardtongue is an herbaceous perennial plant that flowers from March to May (Munz, 1974), occurring at elevations from 2,000-3,000 ft. (700-1000 m.) in alkaline soil (Scogin, 1989). In California, this plant occurs in fine alluvial sand in a wide canyon within a creosote bush scrub community. In Nevada, the plants prefer the base of hills and mountains in wind-blown sand dune-like areas, but are also found in deep loose sand in wash bottoms.

3.5 WILDLIFE

The routes associated with the event traverse a variety of plant communities that provide habitat for various wildlife species. Wildlife expected to occur within the habitats the routes traverse include several species of reptiles such as the zebra-tailed lizard, western whiptail lizard, side-blotched lizard, desert iguana, sidewinder rattlesnake, and speckled rattlesnake. Common avian species associated with the varied habitats include horned lark, greater roadrunner, Le Conte's thrasher, black-throated sparrow, common raven, phainopepla, blue grosbeak, ash-throated flycatcher, western kingbird, blue-gray gnatcatcher, Bewick's wren, rock wren, as well as raptors such as red-tailed hawk, prairie falcon, and golden eagle. Numerous small mammals exist in habitats crossed by the routes including canyon, cactus and deer mice, antelope ground squirrel and round-tailed ground squirrel, kangaroo rats, pocket mice, black-tailed hare and desert cottontail. Large mammals common to the region include badger, ringtail, kit fox, bobcat, coyote, and mule deer.

3.5.1 Threatened & Endangered & BLM-Sensitive Wildlife Species

Several sensitive wildlife species could occur on the proposed routes or within the immediate vicinity of the routes. State and federally listed and BLM-sensitive animals include the following, further described below:

- California and federally listed threatened desert tortoise;
- California listed threatened Mohave ground squirrel; and
- California listed species of special concern, and BLM-sensitive Mojave fringe-toed lizard.

Desert Tortoise

The desert tortoise is a large, herbivorous reptile found in portions of the California, Arizona, Nevada, and Utah deserts. It also occurs in Sonora and Sinaloa, Mexico. In California and southern Nevada, the desert tortoise occurs primarily within the creosote, shadscale, and Joshua tree series of Mojave scrub, and the Lower Colorado River subdivision of Sonoran desert scrub. Optimal habitat has been characterized as creosote bush scrub in which precipitation ranges from 2 to 8 inches, diversity of perennials plants is high, and production of ephemerals is high (Luckenbach 1982, Turner and Brown 1982, Schamberger and Turner 1986). Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. In California and southern Nevada, desert tortoises are typically associated with gravelly flats or sandy soils with some clay, but are occasionally found in windblown sand or in rocky terrain (Luckenbach 1982). Desert tortoises have been found in the California desert from below sea level to an elevation of 7,300 feet, but the most favorable habitat occurs at elevations of about 1,000 to 3,000 feet (Luckenbach 1982, Schamberger and Turner 1986).

Desert tortoises are most active in California and southern Nevada during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and occasionally after summer rainstorms. Desert tortoises spend the remainder of the year in burrows, escaping the extreme conditions of the desert.

On August 4, 1989, the Service published an emergency rule listing the Mojave population of the desert tortoise endangered (50 Federal Register 49868). In its final rule, dated April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened (55 Federal Register 12178). The Critical habitat for the desert tortoise in portions of California, Nevada, Arizona, and Utah is identified in a final rule published February 8, 1994 (59 Federal Register 5820). Following the recommendations of the desert tortoise recovery team, the final rule designating critical habitat established six recovery units over the range of the Mojave population of the desert tortoise. Within recovery units, the Service defined at least one critical habitat unit patterned after the desert wildlife management area (DWMA) concept recommended by the recovery team. A final recovery plan for the desert tortoise was published by the Service in June 1994.

Critical habitat is defined as the specific areas within the geographical range occupied by the species at the time it is listed on which are found those physical or biological features which are essential to the conservation of the species and which may require special management considerations or protection.

The desert tortoise was listed in response to loss and degradation of habitat caused primarily by numerous human activities including urbanization, agricultural development, military training, recreational use, mining, and livestock grazing. The loss of individual desert tortoises to increased predation by common ravens (*Corvus corax*), collection by humans for pets or consumption, collisions with vehicles on paved and unpaved roads, and mortality resulting from diseases also contributed to the Service's listing of this species. During the summers of 1998 and 1999, biologists associated with the West Mojave Coordinated Management Plan surveyed over 2,400 transects over a large area of the western Mojave Desert. These transects failed to detect sign of desert tortoises in large portions of the Mojave Desert where desert tortoises were previously considered to be common. Although these data have not been fully analyzed and compared with previously existing information to date, they strongly suggest that the factors mentioned above have caused a widespread decline in the numbers of desert tortoises in the western Mojave Desert.

Each of the action alternatives include segments which pass through at least one area designated as critical habitat or recommended DWMA, as identified in the Service recovery plan, subsequently in the BLM resource management plans, or plan amendments to the CDCA Plan. Critical habitat units (CHU) and DWMA's within the Western and Eastern Mojave Recovery Units that are traversed by segments of the networks include the Superior-Cronese DWMA and CHU and the Ord Rodman DWMA and CHU in the Western Mojave Recovery Unit; the Shadow/Ivanpah Valley CHU and Area of Critical Environmental Concern (ACEC), Piute/Fenner Valley CHU and ACEC, and the Piute/Eldorado CHU and ACEC in the Eastern Mojave Recovery Unit; and the Chemehuevi CHU and ACEC in the Northern Colorado Recovery Unit. These areas are further described in the Northern and Eastern Mojave Desert Management Plan (NEMO, 2002), the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO, 2002), the Las Vegas Resource Management Plan (LVRMP, 1998), and the Draft West Mojave Coordinated Management Plan (WMCMP, 2003).

Areas of Critical Environmental Concern

The BLM has designated four Areas of Critical Environmental Concern (ACECs) within the Mojave Desert for conservation and recovery of desert tortoise. The ACEC designation indicates to the public that the area's values have met the BLM's ACEC importance and relevance criteria and BLM has established measures to protect those values. The four desert tortoise ACECs that are crossed by routes proposed for the DARPA Grand Challenge include: Piute/Eldorado ACEC, Shadow Valley ACEC, Ivanpah Valley ACEC and Piute-Fenner ACEC. See Exhibit 4 which identifies the location of these ACECs. These areas are further described in the NEMO and the LVRMP.

Large-Scale Translocation Study Site

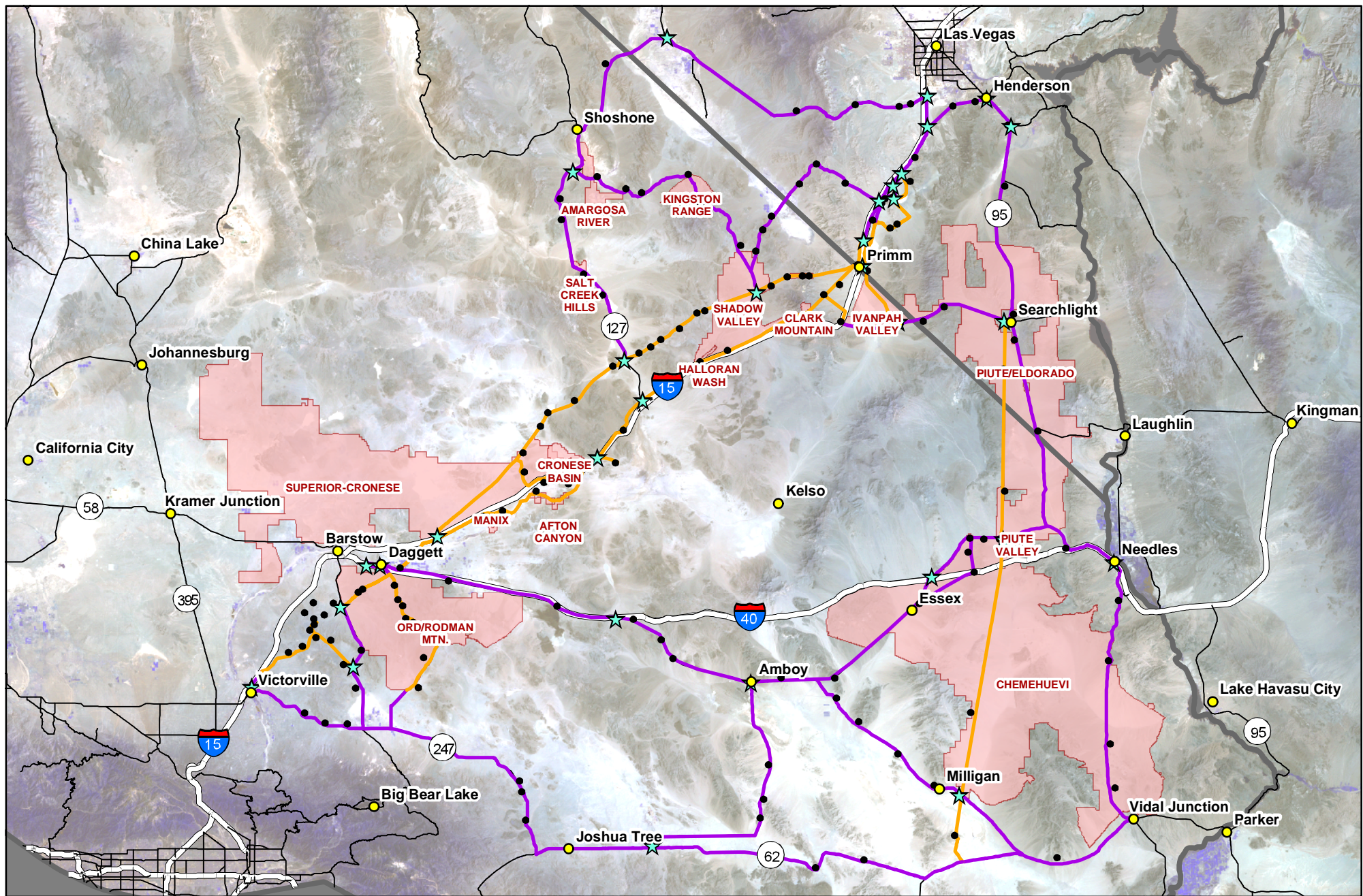
Established by Clark County, Nevada in 1997, the Desert Tortoise Translocation Project Area occurs on BLM administered lands southwest of Jean, Nevada. The Project area, known as the Large-Scale Translocation Study Site (LSTS) covers approximately 22,600 acres and is bounded on the north by State Route 161, the east by I-15, the west by the Spring Mountains, and the south by a tortoise proof fence a few miles north of the Nevada/California state line. The translocation effort was initiated to: 1) relocate desert tortoises displaced as the result of construction and development projects in Clark County, Nevada; 2) provide a means to relocate healthy pet desert tortoises turned in by Clark County residents so as to discourage residents from turning their potentially diseased tortoises out into the wild; 3) study the techniques and viability of translocating desert tortoises to the wild; and 4) to accommodate the large number of displaced tortoises brought in through the County's pick-up service. During a 5-year period between 1997 and 2002, a total of 3,674 tortoises were relocated to the project site (U.S. Bureau of Land Management, 2003a).

Mohave Ground Squirrel

The known range (Gustafson 1993) of the Mohave ground squirrel (MGS) is bounded to the south by the San Gabriel and San Bernardino mountains, to the east and southeast by the Mojave River, to the west by Palmdale and Lancaster, to the west and northwest by the Sierra Nevada, to the north by the Coso Range and Olancho, and to the northeast by the Avawatz and Granite mountains on the Fort Irwin National Training Center. The known range of the MGS is probably associated with elevation, rainfall patterns, temperature, suitable plant communities and substrates, topographical barriers, and other factors. The California Natural Diversity Data Base (CNDDB) has reported MGS from an elevation range of 1,800 to 5,000 feet (548-1,524 meters). Route segments from the Southern Network, which are also included in the Combined Network, traverse MGS habitat to the south and southeast of Barstow.

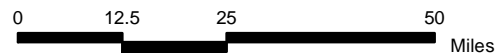
The MGS is one of two members of the subgenus *Xerospermophilus*, which also includes the round-tailed ground squirrel (*Spermophilus tereticaudus*) of the eastern Mojave and Sonoran deserts (Hall 1981; Nowak 1991). The MGS measures 8.3-9.1 inches (32-38 mm) in total length, 2.2-2.8 inches (57-72 mm) in tail length, and 1.3-1.5 inches (32-38 mm) in hind foot length (Hall 1981), which helps differentiate it from the smaller antelope ground squirrel (*Ammospermophilus leucurus*) and the considerably larger California ground squirrel (*Spermophilus beecheyi*). Of these four species, the MGS is the only one found entirely within the western Mojave Desert.

The MGS exhibits a strongly seasonal cycle of activity and torpor (like hibernation), emerging from dormancy as early as January, but more typically in mid-February or March (Leitner and Leitner 1996). Aestivation generally begins sometime between July and September, but may begin as early as April or May during drought conditions (Leitner, et al., 1995).



Data Sources: MDEP, BLM, SRA/DARPA

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|---------------------|------------------|-----------------------------------|-------------|
| ★ Media Locations | — Freeway | — Route Network - Paved Portion | ■ BLM ACECs |
| ● Monitoring Points | — Road | — Route Network - Unpaved Portion | |
| ● Populated Places | — State Boundary | | |



The MGS generally occurs in flat to moderate terrain and is not found in steep terrain. Substrates in occupied habitats have ranged from being very sandy to, less frequently, very rocky (Best 1995, Wessman 1977). The MGS is considered to be absent, or nearly so, on dry lakebeds, lava flows, and steep, rocky slopes (Clark 1993).

The primary threats to MGS are thought to be cross-country travel by off-highway vehicles and road use. While some theorize that MGS are too fast to be injured by vehicles, there is anecdotal evidence that mortality to MGS has been caused by vehicle crushing.

Mojave Fringe-toed Lizard

The Mojave fringe-toed lizard (MFTL) is endemic to southern California and a small area of western Arizona. It is restricted to aeolian sand habitats in the deserts of Los Angeles, Riverside, and San Bernardino Counties in California and La Paz County in Arizona (Van Denburgh, 1922; Smith, 1946; Schmidt, 1953; Norris, 1958; Pough, 1974; Stebbins, 1985). Nearly all localities are associated with present-day and historical drainages and associated sand dune complexes of the Mojave and Amargosa Rivers (Norris, 1958). Route segments for each action alternative traverse areas inhabited by MFTL.

The MFTL is a medium-sized lizard with fringe-toes and other physical features adapted for living in sand habitats. It is distinguished from other species of fringe-toed lizards by the presence of crescent-shaped markings on the throat (Cope, 1895; Heifetz, 1941; Schmidt and Bogert, 1947; Norris, 1958; de Queiroz, 1989). Physical adaptations have allowed the MFTL to achieve considerable speeds on the sand surface (Stebbins, 1944; Norris, 1958; Carothers, 1986), and bury themselves in the sand (Stebbins, 1944; Smith, 1946; Norris, 1958; Carothers, 1986).

Seasonal activity occurs between March and October, with hibernation occurring between November and February (Mayhew, 1964a, 1964b). Daily activity patterns are temperature dependent (Miller and Stebbins, 1964).

MFTL are restricted to areas with fine sand including both large and small dunes, margins of dry lakebeds and washes, and isolated pockets against hillsides (Stebbins, 1944, 1985; Smith, 1946; Norris, 1958). These areas are generally within creosote scrub desert between elevations of 300-3,000 ft (90-910 m; Norris, 1958; Stebbins, 1985).

Threats to MFTL include direct disturbances from habitat loss or damage from urban development, off-highway vehicles, and agriculture, and indirect disturbances from the disruption of the dune ecosystem source sand, wind transport, and sand transport corridors.

3.6 AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC)

The BLM has designated several “Areas of Critical Environmental Concern” (ACECs) within the Mojave Desert. The ACEC designation indicates to the public that an area’s values have met BLM’s ACEC importance and relevance criteria and the BLM has established measures to protect those values. The ACECs that are potentially crossed by routes for the DARPA Grand Challenge include: Piute/Eldorado ACEC, Afton Canyon ACEC, Cronese Lake ACEC, Clark Mountain ACEC, Salt Creek Hills ACEC, Amargosa River ACEC, Kingston Range ACEC, Halloran Wash, Manix ACEC, Shadow Valley ACEC, Ivanpah Valley ACEC and Piute Fenner ACEC. These areas are further described in site-specific ACEC management plans, the NEMO and the LVRMP. Exhibit 4 identifies the location of these ACECs. A brief summary of each ACEC follows.

3.6.1 Piute/Eldorado ACEC

This desert tortoise conservation area is the only tortoise management area within Nevada in the East Mojave Recovery Unit and has been designated by the BLM as an ACEC. It is adjacent to corresponding habitat in California. The area suffered rapid declines in population levels of desert tortoise between 1979 and 1983 and has stabilized more recently (U.S. Bureau of Land Management, 1998). Route segments of the Central Network traverse the northern portion of this ACEC on Highway 164 eastward towards searchlight, and along the west margin of this ACEC on an unpaved north/south transmission road roughly paralleling Highway 95. Route segments of the Southern Network traverse the north-south length of this ACEC on Highway 95.

3.6.2 Afton Canyon ACEC

The Afton Canyon protects a portion of the riparian community of the Mojave River, the scenic values of the canyon, and the adjacent desert habitat in the Cady Mountains, which is occupied habitat for bighorn sheep and contains nest sites for prairie falcon and golden eagle. Open routes through this ACEC remain, but have been re-routed and constrained to provide maximum protection to natural resources (U.S. Bureau of Land Management, 2003b). Route segments of the Central Network traverse the center of this ACEC on the Mojave Road through this ACEC. The route is very sandy in spots and there are two Mojave River water crossings on this route which can get deep after large spring storms. This makes it difficult for vehicles to traverse the route in a few spots without a good four-wheel drive system, and may make the Betty Ford River crossing impassable at times. Given the time constraints of the event, weather conditions may dictate whether this route is feasible.

3.6.3 Cronese Basin ACEC

The BLM designated the Cronese Lakes, north of I-15 between Barstow and Baker, as an ACEC in 1980. The purpose of this ACEC is to protect valuable cultural and natural resources, including the ephemeral wetlands present on the lakes, which serve as stopover points for migratory water birds and nesting sites for many species during very wet years. Mesquite hummocks and desert willow washes add to the biological importance, and the dunes and sand sheets are occupied habitat for the MFTL. The desert tortoise is found in low densities (U.S. Bureau of Land Management, 2003b). Route segments of the Central Network traverse the southern margin of this ACEC on an unpaved transmission road just inside the boundary of this ACEC.

3.6.4 Clark Mountain ACEC

The Clark Mountain ACEC was established to preserve the diverse flora and fauna in this high elevation area. Among the fauna present is the largest relict stand of white fir in the CDCA Plan area. Clark Mountain also has evidence of prehistoric aboriginal occupation, an old town site, and is considered to have spiritual significance to Native Americans. The area contains diverse avian and reptilian populations, including desert tortoise. The Clark Mountain ACEC was designated prior to the establishment of the Mojave National Preserve. When the Preserve was established, most of this ACEC became part of the Preserve. Only a small portion of the northernmost and southernmost areas of the ACEC remain (U.S. Bureau of Land Management, 2002). Route segments of the Northern Network traverse the northernmost portion of this ACEC on unpaved roadways along the southern margin. Route segments of the Central Network traverse the center of the southernmost portion of this ACEC on unpaved transmission roads.

3.6.5 Manix ACEC

The Manix ACEC, located about 20 miles northeast of Barstow along the Mojave River, was established in 1990 by the BLM to protect paleontological and cultural resources. This site also contains blow sand habitat for the MFTL and the terminus of the Mojave Road (U.S. Bureau of Land Management, 2003b). Route segments of the Central Network traverse the northern edge of this ACEC on unpaved roadways along the adjacent rail road right-of-way.

3.6.6 Salt Creek Hills ACEC

This ACEC is 2,205 acres in size and is located along Highway 127 north of Baker, California. It was established by the BLM for its value to area wildlife and for its prehistoric and historic resources (U.S. Bureau of Land Management, 2002). The Northern Network will remain on paved roads along the

southern boundary of this ACEC. Route segments of the Northern Network traverse the southern and western edge of this ACEC on Highway 127.

3.6.7 Amargosa River ACEC

The Amargosa River ACEC is a 9,206-acre conservation area outside of Shoshone, California, and was established by the BLM for wildlife values, sensitive vegetation and riparian habitats, as well as scenic values (U.S. Bureau of Land Management, 2002). The Northern Network will remain on paved roads as it crosses over the narrow neck that separates the two halves of this ACEC. Route segments of the Northern Network traverse the western edge of this ACEC on Highway 127, and the central portion of this ACEC on Old Spanish Trails Highway, a paved roadway.

3.6.8 Kingston Range ACEC

The BLM established the 19,620-acre Kingston Range ACEC east of Tecopa, California, to protect sensitive wildlife habitats. The Northern Network will remain on paved roads as it passes through the center of this ACEC (U.S. Bureau of Land Management, 2002). Route segments of the Northern Network traverse the western portion of this ACEC on Old Spanish Trails Highway, a paved roadway.

3.6.9 Halloran Wash ACEC

This 1,860-acre ACEC was established by the BLM in 1980 to protect sensitive cultural resources found in Halloran Wash at the south end of Shadow Valley just north of I-15 (U.S. Bureau of Land Management, 2002). The Central Network traverses along the southern boundary of this ACEC on unpaved transmission line roads.

3.6.10 Shadow Valley ACEC

The Shadow Valley desert tortoise conservation area is one of three tortoise management areas identified by the BLM for protection of desert tortoise in the East Mojave in California. The valley has been designated Critical Habitat by the Service. It is contiguous with lands managed for viable desert tortoise populations to the south, across I-15, in Mojave National Preserve. This area, in conjunction with areas of the Mojave National Preserve, represents a unique genetic unit within California. Desert tortoise densities in this area currently range from low (5 per square mile) to moderate (50 per square mile). There has been moderate and increasing tortoise die-off from disease in this area in recent years (U.S. Bureau of Land Management, 2002). The Central Network traverses along the southern boundary of this ACEC on unpaved transmission line roads.

3.6.11 Ivanpah Valley ACEC

Ivanpah Valley desert tortoise conservation area is one of three tortoise management areas identified by the BLM for protection of desert tortoise in the East Mojave in California. The valley has been designated as Critical Habitat by the Service. It provides high-density desert tortoise habitat in upper Ivanpah Valley. The area is contiguous with lands managed for viable desert tortoise populations to the south and west in Mojave National Preserve and provides a corridor to public lands further east that are managed by BLM's Las Vegas District, thus serving as a critical linkage between these areas (U.S. Bureau of Land Management, 2002). The Central Network traverses along the southern boundary of this ACEC on Nipton Road, which is paved.

3.6.12 Piute-Fenner ACEC

The Piute-Fenner ACEC is the third desert tortoise conservation area identified for protection and recovery of desert tortoise in the East Mojave in California. The valley has been designated Critical Habitat by the Service. Piute and Fenner Valleys lie approximately west of the Colorado River, south and west of the California State line, and south of Bullhead City. This area is heterogeneous in vegetation and topography, and includes parallel mountain ranges divided by valleys, dry lakes, and bajadas. The Central Network will traverse along the northern boundary of this ACEC on an unpaved, north-south transmission line road, and through the ACEC on Goffs Road, a paved roadway. The Central and Southern Networks traverse along the western boundary of this ACEC on an unpaved, north-south transmission line road, and on paved Goffs Road.

3.6.13 Superior-Cronese Proposed ACEC

The Superior-Cronese ACEC is proposed in the Draft West Mojave Coordinated Management Plan (2003) for the protection and recovery of desert tortoise. It is located in the western Mojave Desert, bordered on the west by Cuddeback Dry Lake, on the north by the southern end of Superior Valley, on the east by West Cronese Dry Lake, on the south by I-15. This area has been designated critical habitat by the Service, and is diverse in topography and vegetation. It includes numerous dry lakes and springs and parts of several mountain ranges. Desert tortoises occur in patchy concentrations throughout the area. Densities are thought to be depressed as a result of a number of human impacts and disease (U.S. Bureau of Land Management, 2003b). The Northern Network traverses the eastern portion of this ACEC on an unpaved transmission line road. The Central Network includes one segment which traverses this ACEC on an unpaved transmission line road.

3.6.14 Ord-Rodman Proposed ACEC

The Ord-Rodman ACEC is proposed in the Draft West Mojave Coordinated Management Plan (2003) for the protection and recovery of desert tortoise. It is located southeast of Barstow and lies approximately south of Interstate 40, east of Highway 247, west of Argus Mountain, and north of the central portion of the Fry Mountains. Elevations range from about 2,500 feet in Stoddard Valley to over 6,000 feet in the Ord Mountains. Distribution of desert tortoise is patchy. The Ord-Rodman ACEC has a long history of grazing by cattle and domestic sheep. Collecting, vandalism, road kills, disease, drought, OHV activities, mining, excessive raven predation and other human-related impacts have also contributed to significant population declines (U.S. Bureau of Land Management, 2003b). The Northern and Central Network traverses the western portion of this ACEC on an unpaved transmission line road. The Southern Network also traverses the center of this ACEC on an unpaved road.

3.6.15 Chemehuevi ACEC

The Chemehuevi ACEC was established by the BLM for the protection and recovery of desert tortoise in the Northern Colorado Desert. It is contiguous (across Interstate 40) with the Mojave National Preserve and Piute Valley ACEC (U.S. Bureau of Land Management and California Department of Fish and Game, 2001). The Central Network traverses the western portion of this ACEC on paved roadways north and south of Interstate 40. The Southern Network traverses the north-south length of this ACEC on an unpaved transmission line road.

3.7 AIR QUALITY

The APE for air quality includes the Mojave Desert Air Basin (MDAB) in California, and the Ivanpah Valley Air Basin (IVAB) and Las Vegas Valley Air Basin (LVAB) both in Nevada. Air Quality Management Districts implement the Federal Clean Air Act, as well as state and local standards for air quality. The Mojave Desert Air Basin is regulated by the Mojave Desert Air Quality Management District (MDAQMD), and the Clark County Department of Air Quality Management regulates the IVAB and LVAB.

These air basins do not meet federal air pollution standards for some criteria pollutants established by the federal EPA. The MDAB is out of attainment with California and federal standards for ozone. However, the primary source of ozone for this region is the South Coast Air Basin, due to urbanization of these areas. Due to the temporary nature of the event, it does not contribute to urbanization, and is not considered to be a significant contributor to ozone in the Air Basin. The LVAB is out of attainment with Federal standards for carbon monoxide (CO). The primary source is combustion due to the rapid expansion of development in this basin. The event is temporary and does not contribute to urbanization, nor is it a significant source of CO.

The MDAB and the LVAB are both in non-attainment of the federal standards for PM₁₀ (particulate matter under 10 microns in size). Primary sources of PM₁₀ are naturally occurring dust picked up by winds; fugitive dust sources such as construction and demolition activities; OHV travel; unpaved public roads and parking lots; industrial activities; OHV open areas; and military activities. Both the MDAB and LVAB have been designated non-attainment areas for PM₁₀ which warrant special considerations and controls. The BLM has implemented a Fugitive Dust/PM₁₀ Emissions Control Management Strategy in cooperation with the MDAQMD, for lands administered by the BLM and within the MDAB non-attainment area. The purpose of the Fugitive Dust/PM₁₀ Control Management Strategy is to implement regulations and control strategies that will bring the MDAB non-attainment area into compliance with the Clean Air Act.

3.8 CULTURAL RESOURCES

Cultural resources refer to prehistoric and historical resources, all of which are found in the Mojave and Colorado Desert regions. Throughout the cultural history of this region, human activities have been closely tied to the distribution of natural resources and other aspects of the natural setting, including water sources, vegetation, wildlife habitat, and certain lithic (rock) materials. Therefore, the distribution of cultural resources is strongly tied to the location of these critical resources. Both short-term and long-term climatic fluctuations have likely affected the intensity of land use over time. Natural topography influenced the location of trails and land use patterns. Dynamic alluvial and aeolian (wind) forces also determined the integrity of preservation of archeological sites over time.

Prehistoric resources found in the region include cairns, rock circles, chert outcrops, fire-affected rock concentrations, flaking stations, lithic scatters, quarries, rock shelters, camps and trails. Historic type sites include the political boundaries (California/Nevada), cairns, camps, roads, structures, trails, trash scatters, mining, railroad components, irrigation structures, and transmission lines.

3.8.1 Native American Religious Concerns

Religious sites important to Native American religion are located within the Mojave and Colorado Desert regions. The BLM initiated consultation with the following tribes in October 2003.

- Chemehuevi;
- Colorado River Indian Tribe;
- Las Vegas Piute; and
- Timbisha Shoshone.

No substantial issues about the event have been raised by any tribes/parties.

3.9 WATER QUALITY

The APE for water quality includes the staging areas used to support the event including the start, finish, media, and spectator areas, and the route segments proximate to the Mojave River (see Exhibit 3).

The Clean Water Act prohibits the discharge of pollutants into surface waters. The Mojave River is the predominant water body in the Mojave Desert. The River spans from the base of the eastern San Bernardino Mountains near Hesperia, eastward through Afton Canyon, and terminates at Soda Lake within the Mojave National Preserve. Most of the water flow in the river is subterranean. In Afton Canyon, the water is forced to the surface by shallow bedrock providing an extensive riparian oasis in the middle of a predominantly arid and waterless region.

The primary water quality impairment of concern in the APE is turbidity (sediment suspended in the water), which inhibits the growth of algae and other microorganisms. Turbidity is created by either stirring up sediment within the water body, or more commonly, from sediment being carried into the water body through storm flows. Sediment sources include natural geologic processes and human induced erosion.

3.10 WASTES, HAZARDOUS OR SOLID

The APE for solid waste (trash) and hazardous waste (vehicle fluid waste) is the staging areas used to support the event including the start, finish, media and spectator areas.

3.11 SAFETY AND LAW ENFORCEMENT

The APE for safety and law enforcement includes all staging areas (start, finish, media, and spectator areas), areas where roadways intersect the network, and any other roadways that will be affected by the recreational closure of the specific route to be used. Affected law enforcement agencies include the California and Nevada Highway Patrol, the San Bernardino County Sheriff's Department, the Las Vegas Metropolitan Police Department and the BLM.

3.12 UTILITIES

The APE for utilities are the utility corridors that the networks follow or traverse, most notably, the Boulder Corridor in the Northern Network, the northernmost east-west route within the Central Network roughly paralleling the north side of the I-15, and a north-south corridor roughly paralleling Highway 95 and continuing southward in the Central and Southern Networks. The two east-west corridors include above-ground and buried utilities. Since the Grand Challenge does not involve any ground excavation or construction, this assessment focuses on the above-ground utilities, including the power conveyance lines

of Southern California Edison, Los Angeles Department of Water and Power and Metropolitan Water District.

3.13 RECREATION AND ACCESS

The APE for recreation and access includes the start and finish areas and all roadways to which use or access will be affected by the recreation closure, including the route networks, portions of intersecting roadways near the route, portions of ACECs near the route, and portions of the OHV areas to be used for the event. Potentially affected OHV areas include Stoddard Valley, Johnson Valley and Rasor, as well as an open lakebed area in Nevada near Primm.

The APE is situated between two major population centers, Metropolitan Los Angeles and Las Vegas, and provides an easily accessible, uncrowded recreation experience. The types of recreation that occur along the potential network are highly varied but may include the following activities: unorganized OHV recreation including cross-country riding in OHV areas, trail use and technical four-wheel drive exploring on public lands routes, organized OHV events; camping; sightseeing; wildlife observation; photography; hiking; equestrian use, target shooting; hunting; rock climbing; land sailing; rock hounding; and model rocket and airplane flying. Some of these activities go hand-in-hand.

Other types of access are provided by the network. Specific leases, easements and rights-of-way, as well as mining claims and plans of operation are held on public lands. In addition mining exploration occurs on public lands. Local residents and visitors utilize certain network segments to access private lands and visit businesses located in rural areas.

3.14 SCENIC VALUES

The Grand Challenge field test would be predominantly conducted within undeveloped areas of the Mojave and Colorado Desert regions that have moderate to high scenic values. Some of the event travels through ACECs and wilderness corridors in areas recognized for their scenic qualities, among other values.

3.15 WETLANDS/RIPARIAN VALUES

A number of route segments cross the Mojave River, which is the predominant hydrologic feature in the Mojave Desert. The River spans from the base of the eastern San Bernardino Mountains near Hesperia, eastward through Afton Canyon, and terminates at Soda Lake within the Mojave National Preserve. Most of the water flow in the river is subterranean. In Afton Canyon, the water is forced to the surface by shallow bedrock providing an extensive riparian oasis in the middle of a predominantly arid and waterless

region. Other riparian areas traversed by route networks include Manix Wash and Halloran Wash. The Northern Network traverses the Armagosa River on paved roadways.